APR 7 2005

MEMORANDUM FOR: Distribution

FROM: W/OPS2 - /s/ Jerald J. Dinges, Acting

SUBJECT: AWIPS Linux Data Server Replacement, Serial MUX Replacement, Gigabyte LAN Upgrade Operational Acceptance Test Report, April 2005

The attached report describes the results for the Operational Acceptance Test (OAT) of the Advanced Weather Interactive Processing System (AWIPS) Data Server Replacement (DX/NAS), Serial MUX replacement, Gigabyte LAN (gig-e) Upgrade. The DX/NAS added a new rack at all AWIPS sites containing the replacement for the old data servers. The data servers were not replaced during this OAT. They will be removed at the end of the software upgrades which will move all the processes currently running on the DS onto the new DX/NAS system (release OB6 in the Fall 2005). The modification tested in this OAT moved all the AWIPS data to the new DX/NAS but left all processes running on the old servers. The gig-e LAN upgrade was added to the current configuration and the new Linux servers and workstations were moved to the faster gig-e switch. The serial MUX replacement was installed but not activated. Later software upgrades will activate the new serial MUX.

The DX/NAS, gig-e, and serial MUX replacement are part of the ongoing tasks to improve AWIPS performance and security and to address AWIPS life cycle support.

There were twelve participating sites during a 90-day period, from late October 2004 to February 2005. The OAT sites included one regional headquarters system, nine Weather Forecast Offices (WFO) with at least one in each of the six NWS regions, one River Forecast Center (RFC) and one National Center for Environmental Predication (NCEP). These sites allowed testing at each of the operational site types.

The OAT Test Review Group **recommends deploying** the remaining sites as soon as practicable with the corrections recommended in the report.

Mary Buckingham, W/OPS24, is the OAT director. Questions or comments should be directed to Mary by e-mail at Mary.Buckingham@noaa.gov, facsimile 301-713-0912, or telephone 301-713-0326 x137.

Attachment

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AWIPS

Linux Data Server Replacement, Serial MUX Replacement, Gigabyte LAN Upgrade

Operational Acceptance Test Report

April 2005

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service/Office of Operational Systems
Field Systems Operations Center/Test and Evaluation Branch

Operational Acceptance Test (OAT) Report for the Linux Data Server Replacement, Serial MUX replacement, and Gigabyte LAN Upgrade

1. Introduction

An Operational Acceptance Test (OAT) of the Advanced Weather Interactive Processing System (AWIPS) Linux Data Server Replacement, Serial MUX replacement, and Gigabyte LAN Upgrade between October 20, 2004 and January 28, 2005. The Linux Data Server Replacements (a.k.a. DX/NAS) are new servers with a Network Attached Storage (NAS) in a new rack added to AWIPS. Refer to the *Linux Data Server Replacement, Serial MUX Replacement, Gigabyte LAN Upgrade Operational Acceptance Test Plan*, October 2004 for details on how the test was conducted.

The DX/NAS OAT successfully completed January 28, 2005 after testing at 12 sites: One regional headquarters [Southern Region (EHU)], nine Weather Forecast Offices (WFO) [WFO Bismarck, ND (BIS); WFO Pleasant Hill, MO (EAX); WFO Sterling, VA (LWX); WFO Burlington, VT (BTV); WFO Midland/Odessa, TX (MAF); WFO Jackson, MS (JAN); WFO Salt Lake City (SLC); WFO Honolulu, HI (HFO); WFO Anchorage, AK (AFC)], one River Forecast Center (RFC) [NorthWest RFC (PTR)], and one National Center for Environmental Prediction (NCEP) [Aviation Weather Center (AWC)].

The OAT:

a. Verified the Linux DX/NAS, gig-e switch and serial MUX replacement AWIPS System Modification Note(s) allowed site personnel to install the new AWIPS Linux DX/NAS, gig-e switch, and serial MUX replacement, connect it to AWIPS, and reconfigure the system with a minimum of disruption to the site data flow and operations.

b. Verified the AWIPS Linux DX/NAS, gig-e switch and serial MUX replacement and reconfigured system operates reliably during site operations in a 90-day demonstration at 12 sites.

c. Verified the AWIPS Linux DX/NAS and gig-e switch replacement product and data retrieval are at least as fast and reliable as the existing Hewlett-Packard (HP) Data Server (DS).

d. Verified the AWIPS Linux DX/NAS and gig-e switch replacement, reconfigured DX/NAS,

DS and Application Server (AS) can be switched to their backup configurations and support the site's needs.

e.   Verified the Network Control Facility (NCF) can monitor the AWIPS Linux DX/NAS, gig-e switch and serial MUX replacement .

f.   Verified the site service backup can operate correctly with a non-DX AWIPS site and vice versa.

2. Recommendations

The OAT Test Review Group **recommends deploying** the remaining sites as soon as practicable with the corrections recommended below to the hardware and software installation scripts. The recommendations to the AWIPS System Engineering Modification Note 24 have already been incorporated.

1. NGIT provide the missing labels for OAT sites and ensure they are included for all Field Modification Kits (FMK) (HUB1-PTR, HUB2-PTR, HS1, HS2, and the new label for LA1AW122 from M&C2 to PSW Port 16)
Action: NGIT ensure the FMKs include the labels for HUB1-<siteid>, HUB2-<siteid>, HS1, HS2, for all sites and the new label for LA1AW122 from M&C2 to PSW Port 16 for those sites with two Xyplexes.

NGIT send the labels to the OAT sites that have not already received them.

2. Ensure the PX gig pocket hubs are included in the FMKs. These were retrofitted to all OAT sites and included in all early deployment sites.

3. Hydrometeorological Automated Data System (HADS) data were going via FTP to the ds1. OH needs to decide where to put the data on the new systems (perhaps the REP?).
Action: OH take action to decide the final disposition of the HADS data on the reconfigured AWIPS no later than the OB6 development.

3. The DX/NAS documentation for the system pieces is missing at some sites.
Action: NGIT provide the system documentation to all sites missing it.

4. Add the HP workstations used for RFC Geographic Information System (GIS) into the scripts. Regardless of their being slated for replacement in the future (not on a schedule at this time), they are still in the RFC baseline and should be upgraded automatically.
Action: NGIT incorporate the HP GIS workstations in the scripts or a workaround with the NCF attaching the systems at the affected RFCs.

5. WFO Honolulu (HFO) and 6 other sites (Pacific Region Headquarters [PBP], WFO Guam [GUM], Alaska Region Headquarters [VRH], Storm Prediction Center [SPCW], Tropical Prediction Center [NHCR], Aviation Weather Center[WNAR]) have no communication rack in their physical sites and have solid side panels in their VIR switch panel rack *(however, WNAR*

has an open side panel). This prevents the installation of the fan cable connecting the new serial mux card to the VIR switch panel 2. At HFO, a third VIR switch panel is unused. It is suggested to connect the fan cables to the VIR switch panel 3 at the time of the AS1 rack de-installation when the serial mux will be activated.

Effect: This will continue the non-standard configuration at HFO which causes a lot of complexity and expense in special engineering for them for no reason other than the existence of the solid side panel.

Recommendation: At the time the AS1 is decommissioned and that rack is removed, remove the side panel, remove the unneeded VIR switch panel 3 and connect the fan cables to the VIR switch panel 2 as specified in the mod note. This will standardize HFO with the rest of the AWIPS sites in this respect.

6. AFC had a NAS disk die. It was discovered accidently by an ET who noticed the light was amber instead of green. It was unclear whether the NAS disk health was being monitored by the NCF. (The shipment of a replacement was fast. The ESA performed the replacement and it automatically restored.)

Effect: Multiple disks could fail without anyone knowing and impact operations.

Recommendation: Devise a standard notification to the NCF for NAS disk failure. NGIT advised the ITO/OPs were configured for the NAS after the installations were complete and they are able to automatically see failures.

Action: SET request action from NGIT through COTR. Completed

All other OAT recommendations have been addressed in the mod note, including the change to the crons (attachment E, RFC and NCEP specific configurations, etc.)

In addition, several significant flaws in the NWS overall management of AWIPS changes to the field aggravated the installation of the DX/NAS upgrade. Since this was the single largest change to the heart of the AWIPS (i.e., the data), the flaws made the upgrade more difficult that is necessary. In some cases there are no structures or resources in place to effectively address the flaws.

Programmatic Deficiencies

1. **Communication of changes affecting operations and system configurations is insufficient.** The DX installation made a major change to the system by moving all data to the NAS. This affected mounts to all other servers in the system, relocated and in some cases renamed local directories, the way the crons were arranged was changed and all local crons deleted. None of the changes in themselves represent a deficiency but the processes of communicating such changes to the field in an effective manner is not working well resulting in confusion and difficulty in repairing local applications and configurations. The mod note was revised to contain some of this information but is not necessarily the right vehicle to get

all the operational impacts to the right field personnel since the are directed to the electronics staff and often other personnel are tasked with non hardware care of the local AWIPS. The software releases have the Release Notes vehicle which contains such operational and local configuration impacts. There is no staff resource in the NWS available to produce a Release note for hardware implementations. The advance notice from the contractor (NGIT) of system changes and their effect on local operations and configurations was insufficient. These things were not learned until well into the OAT installations and the existing vehicles for educating the field continue to be lacking.

Among the items that caused confusion and delays in getting local configurations repaired after the installation are (see Attachment A):
1. AWIPS Archiver Config files overwritten at some sites
2. Ignorance that the role of the PX servers changed and the PowerVault is put out of service
3. Change to the way the crons are handled
4. Deletion of all local crons and some not local crons like the Interactive Forecast Preparation System (IFPS) crons
5. Non-standard systems were not reconfigured and mounted to the new hardware (i.e., the HP workstations running the GIS at RFC and the River Ensemble Processor (REP) at RFCs.
6. Changes to the data backup. The old tape system is disabled and little information was available as to how to use the new system. The RFC nightly backup system was broken.
7. RFC data were moved to a directory with a different name on the NAS requiring local links to be changed.
8. HADS products need to be repointed to a different server. OH needs to decide were they will reside.
9. The directories where the data were taken and move to were not clearly identified to the field forcing them to hunt missing data down that they had set up (local configurations).
10. There are a lot of complaints about the changes routinely destroying local configurations and setups requiring days of work to restore the system after each installation - both software and hardware although most sites say the hardware upgrades cause less disruption than the software builds.
11. Lack of a clear understanding for the role of each server in the upgraded system and the next steps in the upgrade process (i.e., the next software loads and the next hardware upgrades.

Recommendation: The contractor should be tasked to deliver hardware change release note drafts describing the system changes including hardware and software architecture changes after the mod is made. Detailed changes to file systems, locations of system configurations, old parts of the system that are removed from service, all parts of the software and hardware that are changed with the modification and why it was done should be included. The release notes should be delivered at the time the mod note draft is delivered to the government for review. Procedures should be set up to post the release notes on the AWIPS sites and to the list servers so all NWS users will have exposure and access to them.

2. **Delays in making the updated mod note available to the deployment sites.** Because of numerous issues that arose and were addressed both during and after the OAT test period

during the early deployment, updates to the mod note were not made available to the field sites in a timely manner and many sites installing the system during the early deployment period did not have the benefit of full and complete notes and attachments. This caused unnecessary hardship and delays in repairing local configurations.

Recommendation: OPS12 should revise their procedures for making post OAT updates to the mod note to facilitate more rapid field site access to the updates before and during deployment. Field site access to the drafts should be considered after technical review of the contents is made and before the formal signature is completed to facilitate the installations.

3. **Disorganization in ensuring the implementation and deployment is run smoothly and all necessary information is available to the field when needed.** The rush to deploy a third of the DX/NAS systems early exacerbated the disorganization of the deployment. The mod note was not updated and made available in a timely manner, there were many questions about what do with the system (see item 1). Many sites stumbled on the same problems earlier sites experienced because there is not an efficient process in place or anyone who takes responsibility for managing all the implementation aspects of the hardware upgrades. This has been a longstanding deficiency noted in previous upgrades.

After the early deployment was completed, NGIT requested informing the field not to mount or use the old PowerVault disks that had been attached to the PXs. There appears to be some confusion in the field and the possibility may exist that a site would remount the PowerVault for local use. This would have ramifications for both the OB5 software release (/px1data & /px2data cleanup) and the OB6 software release (reuse of the PowerVault for Postgres databases). While a late amendment to the mod note might help in this regard, the personnel in the field who might wish to use the PowerVault for other purposes might not ever see the notes. There is presently no vehicle for ensuring field personnel understand how each change fits into the overall plans for AWIPS use and therefore industrious field personnel can easily invent useful things that will get trampled upon or cause more problems by the future changes.

Recommendation: Implement the recommendations outlined in the *AWIPS Hardware Implementation Process* white paper, April, 2003 addressing the implementation needs for the NWS to deploy AWIPS hardware into the field and minimize disruption to operations.

4. **Lack of clear guidance for RFC use of the REP.** Although the REP was deployed a year ago to address the high availability and large data quantity needs for the RFC apparitions and the Advanced Hydrologic Prediction System (AHPS), the sites complained of a lack of direction and guidance on how they were supposed to use the system. Consequently, many RFCs have not made much use of the REP and it wasn't fully updated in the DX/NAS scripts despite it being a baseline system. Many RFCs are hesitant to do the work necessary to move some of the their operations on the REP without clear guidance from OH because of the history of locally configured things being wiped out by the next release. It is just too much work to take that risk. This also made it difficult for the contractor (NGIT) to ensure the REP was smoothly updated when the DX/NAS was activated. RFCs that use the REP for some activities had to manually fix it and the mod note did not address REP issues because there is no clear guidance to make any suggestions.

Recommendation: OH should decide how the REP should be configured to meet the programmatic and operational needs of the RFCs. They should create procedures and guidance so the RFC may make the local changes and configurations they need and retain them from upgrade to upgrade.

3. Purpose

The purpose for the OAT was to provide NWS management with information about the installation process and the operational and maintenance impact, performance, and reliability of the new hardware and software at a representative sample of NWS offices. The test extended over a 90-day period and aid in improving the installation process to reduce the adverse impact on field operations during deployment.

4. OAT Objectives and Results

The following were the objectives of the OAT and the results of testing:

a. **Verified the Linux DX/NAS, gig-e switch and serial MUX replacement AWIPS System Modification Note(s) allowed site personnel to install the new AWIPS Linux DX/NAS, gig-e switch, and serial MUX replacement, connect it to AWIPS, and reconfigure the system with a minimum of disruption to the site data flow and operations.**
OAT RESULT: This objective was met.
Discussion: The installation required sites to go into service backup but the timing could be at the site's determination. Sites using the IFPS had to check frequently during the hardware phase with the forecasters to ensure their work was not destroyed. This added considerable time to the installation. The mod note was changed to warn the installer at each step where a potential effect on the operations might occur. Some of the early installations experienced LAN problems resulting in system shutdowns and subsequent recoveries. A methodology for attaching the new equipment was found that prevented further problems and the mod note warned of the danger at the appropriate step. However, in the final installations, if the final mod note was followed carefully, the installation was successfully done without adversely impacting site operations.

b. **Verified the AWIPS Linux DX/NAS, gig-e switch and serial MUX replacement and reconfigured system operates reliably during site operations in a 90-day demonstration at 12 sites.**
OAT RESULT: This objective was met.
Discussion: There were few complaints after a couple of infant failure incidents were repaired of any system reliability problems.

c. **Verified the AWIPS Linux DX/NAS and gig-e switch replacement product and data retrieval are at least as fast and reliable as the existing Hewlett-Packard (HP) DS.**
OAT RESULT: This objective was met.
Discussion: The reconfigured systems were measured to perform the workstation performance rating test at a 30 to nearly 80% increase in speed (see Attachment B). Forecasters frequently believed it ran almost twice as fast as before for the D2D functions

and most RFC functions. The IFPS was believed to run a little better but the reports for this program were uneven.

d. **Verified the AWIPS Linux DX/NAS and gig-e switch replacement, reconfigured DX/NAS, DS and AS can be switched to their backup configurations and support the site's needs.**
OAT RESULT: This objective was met.
Discussion: All tests for the backups were successful. The heartbeat failover software appears to be a big improvement over the Advanced Server Cluster manager that had been implemented in the PXs. During the installation, most of the sites had few of the PX failovers work correctly but once the new system was activated and the old cluster manager removed, the failovers worked without fail.

e. **Verified the Network Control Facility (NCF) can monitor the AWIPS Linux DX/NAS, gig-e switch and serial MUX replacement .**
OAT RESULT: This objective was met.
Discussion: Once the NCF manually configured the ITO/OPs onto the NAS, they successfully monitored the new hardware.

f. **Verified the site service backup can operate correctly with a non-DX AWIPS site and vice versa.**
OAT RESULT: This objective was met.
Discussion: Every installation required the site go into service backup. There were no reports of any problems for either the backup site or the site being backed up.

5. Conclusions

The AWIPS Linux DX/NAS, gig-e switch were a very beneficial addition to NWS AWIPS systems with noticeable and measurable increases in speed in processes and at the forecaster's desk. The system upgrade addressed speed problems without the software changes where the processes are moved to the new hardware.

The significant changes to system configurations and operations entailed by this upgrade were not handled as well as they should have been. Longstanding flaws in the NWS structure and processes in place to handle the hardware upgrades exacerbated the installation and left the field personnel with a lot of confusion. The field does not have a good understanding for how the new system is set up and what further changes will be made as the Linux upgrades continue. This ignorance leaves the NWS vulnerable to chaotic implementations as the field makes use of the new systems but the next upgrades might interfere with what they have done or vice versa.

The Test Review Group recommends deploying the new AWIPS Linux DX/NAS, gig-e switch at all AWIPS sites and implementing the recommendations outlined in the white paper *AWIPS Hardware Implementation Process*, April, 2003 addressing the implementation needs for the NWS to deploy AWIPS hardware into the field and minimize disruption to operations.

Attachment A: Outstanding Problems from the Early Deployment Phase

Below are outstanding problems noted during the early deployment phase.

Issue	Description	Sites affected	Found in OAT?
AWIPS Archiver Config files overwritten	AWIPS Archiver Config files had been overwritten with baseline ones during the upgrade (/awips/archiver/arch_root/config/*.cfg). Our /data/archive partition on the AX filled up because of this. Our archive config got overwritten as well during the dx install. I had to restore our config. I think only sites that edit the defaults considerably will notice, but it should be in the notes. ax in /awips/archiver/arch_root/config named *.cfg	Some	No
Purge problems	In new dx install, the old fxa-data.purge.px file is no longer used. The new purge method is now done by a localization process. It appears that the default cluster managed cron on px2 is now running master purge (at least on our system). Since I had neglected to update fxa-data.purge.px on my px2, when the purge ran there it was utilizing the baseline purge configuration. Copying fxa-data.purge.px to px2 should enable a site to store the number of model versions they want...at least until this becomes a localization issue down the road. Instructions for running the dx purge files. This allows sites to store extra model data. Intelligent purge file is now controlling the grid data. The main file is located in nationalData and called gridPurgeInfo.txt This file is copied to customFiles directory and renamed as localPurgeInfo.txt Make changes to this file to increase purge parameters for model data. Run **./mainScript.csh –purge** on px1 and px2. After running mainScript, run **stop purge** process. On px1, as user fxa in /awips/fxa/bin: **ps -ef |grep purge** **kill -9 <purgeProcess PID>** Make sure purge Process is killed by running another **ps –ef |grep purge** To restart the process type in: **${FXA_HOME}/bin/purgeProcess -commit &** <return> <return> Do another **ps -ef |grep purge** to make sure only one is running. The start process is also setup in the cron file and will restart it in about 10 minutes if it finds the purgeProcess is not running. If two are running, this will slow down AWIPS. This is a known problem and a DR will be open.	Most or all -sites who changed the purge parameters to store additional data	No

	After mainScript is run, a file is created called purgeInfo.txt which Displays the files modified. This file is located in /awips/fxa/data/localizationDataSets/XXX The satellite data are still being purged by fxa-data.purge.px file. This will change to the intelligent purge with release OB6.		
RFC REP mounts not made	At some RFCs, the REP was not mounted when the NAS is activated. It was treated as a non-baseline system and left to the sites to manually make the changes to point it to the NAS. The REP is a baseline system but the failure of the OH to produce configuration instructions to the RFCs results in the AWIPS program's inability to incorporate the REP into the activation scripts since it is not known how each RFC is using the system, if at all.	All RFCs	Yes
RFC configurations	RFCs had to add the last line of /etc/profile both on DX1 and DX2: . /awips/hydroapps/lx/public/bin/awips.profile User environment was incomplete without issuing the instructions in that file.		
RFC nightly data backup of the NAS	RFCs routinely backup their data every night since they have no service backup options. There is no guidance about whether the new tape drive is acceptable for this purpose or how they should set it up. Their nightly backups were broken after the DX installation. On any box where /awips/rep is mounted is a directory, /awips/rep/.snapshot, which provides for 7 nightly and 4 weekly snapshots. This provides an online backup of files and has proven quite handy in tracking down accidentally trashed files. We have been using /awips/rep/lx to hold all our LX files and have a link at /awips/hydroapps/lx pointing to /awips/rep/lx. However, I could not find equivalent snapshot directories on any of the file systems exported from NAS1. Logging in to NAS1 as root, I can see there are weekly snapshots taken this morning (050214 at 00Z) for awips_dev, awips_home, data_local, and awips_adapt but not awips_hydroapps. I could not find ".snapshot" directories on any of the linux boxes where these file systems are mounted. And, with the nightly tape backups on the DX failing due to the missing script, I'm thinking we have limited file system backup. All we have for /home, /awips/hydroapps and the others is a weekly tape backup. And I'm not sure how I'd pull anything off that tape.	All or most RFCs	Yes
HADS products	OHD had to redirect FTP of HADS products formerly going to /awips/hydro/data to /awips/hydro/px_hydro/data directory.	All RFCs	Yes
Local crons not working after installation	When it says backup local crons. That includes ifps crons, which the field didn't think were classified as local crons, but the ifps crons got wiped on all of servers/workstations. The Cron attachment in new mod note explains how to set up local crons.	All sites	Yes
Some local data were not moved to the NAS	During the install data is copied from px1data and px2data to the nas1 storage, but seems only baseline directories are copied. Anything else is not copied. We used px2data to hold a lot of archive/case data. After the install, there was a little anxious moment when I thought a lot of data was lost. Just had to remount px2data on px2 to get to the	Some sites	No

	data. Don't know what the plan is for the hard drives on px1 and px2, but it is good to know that those drives are not wipped out by the dx software install. Because of this you may want to make a backup of your /etc/fstab on px1 and px2 prior to the install to see how those drives are mounted.		
DR: /tmp/clu*.out files accumulating on ds1 servers.	This problem appears to occur after an AWIPS system installs the DX/NAS hardware. On the DS1 server in the /tmp directory clu*.out files are created where * represents a process ID number. The clu*.out files show the status of the DX1/DX2 cluster and the files are 732 bytes in size. A new clu*.out file is created every 8 minutes so an AWIPS system with the DX/NAS hardware accumulates 180 of these files per day. It does not appear that the clu*.out files are purged so there is a possibility that the DS1 /tmp directory will fill up with these clu*.out files. This DR is listed as a major because I believe that the DS server will encounter an automated reboot if the /tmp directory fills.	Most sites	No

Attachment B: Workstation Performance Rating Data

Workstation Performance Rating

Site	WS		Pre-DX			Post-DX			% Change	Workstation Load
			WPR	Avg CPU Use	Avg Mem Use	WPR	Avg CPU Use	Avg Mem Use		
WNAW	LX3	Z-Pro	131	15.8%	90.4%	39	19.2%	55.1%	70.2%	nothing else
AFC	LX8	Z-Pro	133	12.0%	86.1%	41	17.1%	51.2%	69.2%	running 2 GFE sessions, E and W domains
	LX2	M-Pro	53	29.7%	31.3%	52	33.2%	58.0%	1.9%	nothing else
HFO		Z-Pro	80	10.9%	89.9%	18	25.5%	77.4%	77.5%	
LWX	LX1	M-Pro	71	19.9%	84.8%	50	27.4%	41.8%	29.6%	nothing else
	LX3	Z-Pro	138	13.3%	93.1%	54	26.7%	85.5%	60.9%	1 GFE, 1 additional D2D
PTR	LX2	M-Pro	93	31.9%	90.4%	63	28.1%	40.6%	32.3%	
	LX4	Z-Pro	174	13.0%	92.9%	44	20.7%	65.1%	74.7%	
	LX5	Z-Pro	96	12.5%	51.7%	45	73.6%	87.6%	53.1%	
SLC		Z-Pro	190			50			73.7%	
AWC	LX4	Z-Pro	131	15.8%	90.4%	39	19.2%	55.1%	70.2%	nothing else

Average % change	55.7%
Average on M-Pros	21.2%
Average on Z-Pros	68.7%
Max	77.5%

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Attachment C - Interim Site Status Reports

DX/NAS/Serial MUX Installation at SRH – 10/28/04

We have completed the DX/NAS/Serial MUX Installation at SRH this morning. It was long but went pretty well. A major stumbling block was having to replace the LX2 because of disk errors. It took 8 hours to get that restored from scratch. This process should be streamlined.

We had a couple of script failures which were passed along to NGIT to fix before the next installation, but all in all it went fairly smoothly. We had numerous changes to the mod note to clarify things and include some extra checking to make the installation go a little more smoothly.

SRH ran the new cables last week which left only the rerouting of the cables from the PX to the new gigabit switches during the main installation.

We recommend that all sites look at what they've got on their disks and delete all the old and unused stuff. The DX/NAS activate script moves everything over to the NAS so the less garbage it has to move, then the less time it will take. It took this site about 4 3/4 hours to move the data.

The system was left with a few errors at the end of the installation:
PX2 didn't get mounted properly
The /home directory didn't get mounted
The dsswap package wasn't enabled.

The fstab was set up correctly so we rebooted PX2 and the workstations to get the mounts restored and asked the NCF to restore the data spooled on the CP while we were down.

The verification processes SRH runs on another system failed because we forgot to change the mounts to it. This is the sort of thing that sites can expect after the installation is complete. Local applications and servers will probably have to be manually mounted and pointed to the data relocated to the NAS. Only the sites will be able to do this because there is no way for WSH or NGIT to know all the local things that are at the site.

The total time it took to install the DX/NAS/Serial MUX at SRH was about 3 days including laying the cables. Several hours were spent in waiting to get the LX2 back up and healthy and extra time was spent in resolving some script problems and figuring out the state of the system problems that occurred. The LX problems were a separate issue and those have to be dealt with as they occur. The changes to the mod note should facilitate some of the confusion or time it took to find that there were problems needing resolving. So, I expect the estimate of 2 days is still about right once we get the installation going a little more smoothly.

Sites that have a lot more data will take significantly longer to do the backup step that took 4 hours at SRH. It is estimated that this step will take about 10 minutes per gigabyte of data on the system. The following directories are moved:
/awips/adapt
/awips/dev
/home
/awips/hydroapps
/data/adapt
/data/fxa

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/data/local

Mod Note Section A took about 2 hours 45 minutes not including laying the new cables. That adds another 2-3 hours.Section B took about 4 hours (Serial MUX installation)
Section C to step 6 where the mod note marks end of day 1 took about 2 hours
Section C step 7 to end took about 1 ½ hours.
Section D took about an hour
Section E took 7 hours. The two longest scripts are the ssh and the Backup_AWIPS. The ssh script at SRH took about a half hour (3 secs for every user on every server in the system). The backup script took 4 hours 40 minutes. SRH had a lot of old garbage that could have been deleted to reduce the time to move all the data to the NAS. The activation script took about 40 minutes.
Section G took only about 15 minutes.

The operations were not affected until Section E. Some of that time will be reduced for a regular WFO because of some fix-it time required from the early installation and script problems that should get fixed for later installations. However, it will be a long down time at all sites and they should plan accordingly. The mod note can be stopped and restarted at any point up to Section E.4 (and AWIPS restarted) if necessary because there have been no changes to the working system up to that point. However, once Section E.4 is started, the mod needs to be completed.

Sites can ask the NCF to restore their data once the system is back up so the forecasters get the data that was missed during the down time. The data continue to be spooled on the CPs.

The OAT procedures worked but I will be making some fixes to them. I'll send out revised procedures next Monday.

The XT installation is a prerequisite for the DX install since the scripts for the XT install will fail if used on the new DX/NAS system. The prerequisites are OB4 and XT before the DX/NAS. You need two 120 volt 20 amp circuits available and near the DX rack position with a floor cutout under the rack. The lower power cord was able to reach a receptacle a floor tile away from the rack. The other power cord needs to go the height of the rack and down, so its receptacle should be closer.

Bryan Henry is here on a detail from WFO JAN and has the honor of being the first field forecaster to use the new DX/NAS system. He says the retrieval of data into D2D is significantly and very noticeably faster, so that is good news.

The next OAT site installation will be WFO Sterling, VA beginning Nov. 2. This is our first operational site installation. The next conference call will be at 2pm EST with the same call number and access code.

Thanks to SRH for being a test site and helping us out. And thanks to Mike Ryan, ESA at WFO Jackson, MS for coming here to help.

DX Install – LWX 11/2-4/04

Day 1

This installation presented us with numerous problems. The estimates for length of time to install in the WFOs may have to be extended due to the IFPS usage. The mod note requires several brief interruptions to the LAN and PX failovers. Because of operational use of IFPS nearly the whole day and its running on the PXs, each interruption must be coordinated with the forecasters. This introduced several wait periods into the installation while the forecasters got to a stopping point.

A bad ProCurve transceiver module in HSW2 caused a LAN lock when the PX1 was brought up on the new gig-e switch. This ended up causeing a system "meltdown" and required reboots of the DS and AS's as well as the PXs to restore the system. At this point, the MIC requested we restore the system and stop further installation activities due to the sensitivity of Election Day. Within an hour the system was restored to functionality and by mid afternoon, the system was restored fully. It performed without a glitch overnight with PX1 connected to the new gig-e switch and

PX2 connected to the old HSW. Only one ProCurve transceiver module was connected to the new gig-e switch.

To address the risk of trying the new LAN hardware for the first time in operations, a new procedure was added to the mod note to test the new hardware with the CP prior to trying it on the LAN. This should reduce the risk of repeating this problem due to a bad hardware piece.

Day 2

A couple of hours were spent in the morning diagnosing, repairing, and devising the new test procedure for the gig-e LAN before restarting the installation. The installation proceeded somewhat slowly because for each PX or LAN affecting step, we had to check with the forecasters and often wait from 10 to 40 minutes for them to reach a stopping point. A couple of times, we had to fix the LAN configuration that was done in an earlier step, but had been returned due to the problems with the bad ProCurve card. We finally reached the end of day 1 in the mod note (step C.6) at 12:45 pm. Another 20 minutes finished step C and writing the configuration to the xyplex. We ended there because there is a slight chance of interrupting the LAN during step D so we elected to do that first thing in the morning the next day.

Day 3

Service backup was handed to LWX's backup site PHI at 8 am. The system was back up by 11:45. We spent another half hour to run the PX failover tests and for the first time since we started, the PX packages all started automatically with each swap. At the end they no longer use the cluster administrator and now use the open source heartbeat.

The forecasters reported no problems in using the system and noticed product retrieval is faster. The eta and gfs model grids were missing and the forecasters requested they be resent. Most of the buffered data automatically is sent from the CPs once the acqserver comes up.

This day went very smoothly and the backup took less time than anticipated, 1 hour and 40 minutes for 18.6 gigabytes.

The workstation performance rating on LX1, an M-pro, was 71 before the changes on a clear day and 50 afterwards with lots of rain on the radar. There were a couple of things needing repair in the script which NGIT fixed manually and will repair in the scripts for the next installations.

In all we took 2 ½ days to complete the installation here.

Mod Note Times:
Section A: about 2:30 hours including laying the new cables and getting a cutout in the floor tile.
Section B: about 1 day due to LAN wrap and complications – bad gig port switch (Serial MUX installation)
Section C to step 6 where the mod note marks end of day 1: about 1:45 hours
Section C step 7 to end: about 20 minutes
Section D: about 10 minutes
Section E: about 40 minutes
     E.1: 25 minutes
     E.2: 16 minutes
Section F: about x hours
     F.1: 2 minutes
     F.2: 3 minutes
     F.3: 25 minutes (35 users)
     F.4: 1:40 hours
     F.5: 35 minutes
     F.6: 3 minutes
The two longest scripts are the ssh (F.3) and the Backup_AWIPS (F.4). The ssh script takes 3 secs for every user on every server in the system. LWS has 18.6 gigs to move to the NAS after having cleaned up their disks of the old and unused. The Backup_AWIPS script takes about 10 minutes per gigabyte of data and moves the directories listed in

the mod note (F.6) from the DS and the PX PowerVault. The activation script (F.5) does the remounts and links to the new data.

Section G: about 10 minutes.

Afterwards:

Errors found and actions:

1.   The PXs here did not automatically start the swap and IFPS packages. They needed to be restarted manually at every PX change. Thus we are having the NCF involved for each swap to monitor. We also have the installer notify the forecasters to ensure operations are not unduly disturbed. This will likely add time to the installation because we had to wait for the forecasters to get to a stopping point frequently.

2.   There was a significant amount of confusion over the duplicate labeling on the old Plaintree hub switches named LS1 and LS2, and the new gig-e switches labeled the same thing. Since the old switches internally are called hub1 and hub2, NGIT will include new labels for the Plaintrees to label them HUB1 and HUB2. In addition, since some sites have the high speed LAN switches labeled HSL/SW1 and 2 but they are actually referred to as HSW1 and HSW2, NGIT will also supply new labels for them as well. The mod note will instruct to put the labels over the old ones on the Plaintree and on the Port 25 plate cover on the HSWs at the start. This should alleviate the confusion. NGIT will send the new labels to the OAT sites and the test sites, then include them in the FMKs for the deployment sites.

3.   The Netgear gigbit boxes were mislabeled DX1 and DX2 instead of DX/SW1 and DX/SW2. This also occurred at SRH. NGIT will send correct labels to the sites and get their subcontractor, GTSI, to label the parts correctly.

4.   The cable label for LA1CW196 to PSW Port 1 and PhubDS Port 4 was mislabeled as Port 3. NGIT brought a corrected label and will ensure the labels on the rest of the systems are correct (step B.25). The label in the mod note is correct so any sites receiving the mislabeled cable should follow the mod note, pencil in the correction on the label and request NGIT to send a new label if they haven't already.

5.   A bad ProCurve transceiver module in HSW2 (step A.5, Figure 2) was discovered and caused serious problems with the LAN and system. A new procedure to test the new gig-e switches and cables before going live in AWIPS will be inserted into the mod note.

6.   Numerous clarifications to the mod note were made and given directly to the author to change.

7.   The steps required to get non-awips baseline systems updated are involved. In addition to putting the mounts in fstab, the ssh needs to be updated. NGIT followed all the steps in the Activate_NAS script and manually applied them to the non-awips box. NGIT will work up a procedure sites can follow to facilitate this task and have a draft available to try by Wednesday, Nov. 10 for the AFC installation test.

DX Installation – AFC 11/7-11/04

The installation took 4 days at AFC. The biggest problem encountered was a failure of the NAS motherboard CPU. This required emergency shipping of a new module from Seattle. With some persistent checking and insistence by the AWIPS Focal Point, the new module was delivered Wednesday night at 8:30 local time. The morning of Veteran's Day, we met at the office at 7AM and called the NCF and NGIT to get instructions on how to replace the module. It took a couple of tries before it got seated properly, but it finally booted and NGIT verified it was operating correctly. We resumed the scripts by rerunning the Update_NAS.sh script.

Day 1

The site had run the new cables before we arrived and connected one end of them. I requested they remove the connections as the test requires following the mod note to test the instructions. Some of the cables weren't connected to the port assigned in the mod note because of conflicts with other equipment so they connected them to an open port in the M&C. This caused several delays at various points when the NCF couldn't find the new equipment. We traced down the errors and worked with the NCF to find another home for the conflicting equipment according to the end state cable connection chart the NCF has. These conflicts arise because of the many additional workstations and other things necessary to run this site. There was also some confusion over whether the mod note meant M&C 1or M&C 2. Since the DX mod note is trying to get the M&C connections standardized as much as possible, we strongly recommend sites follow the cable port assignments specified in the mod note, clarify that we mean use M&C 1, and contact the NCF to find homes for any conflicting equipment. This will help the maintenance and support tasks in the future.

The day presented several delays due to the NCF having difficulty seeing various parts of the new system and having to fix it. The px's again did not often fail over cleanly and needed frequent reboots before they came up correctly. We finished the end of day 1 mark in the mod note at about 4PM.

The px3 and px4 cables arrived mid morning with the new labels for the cables and to correct the names for the Plaintree switches and high speed LAN switches.

Day 2

The Xyplex M&C console continued giving problems and we needed NCF help to get it in the right configuration to proceed. We completed the mod note up to the scripts in step E by 10:30AM.

The rest of the day was spent in figuring out how to get the px3 and px4 connected to the gig-e switch, move the data to the NAS, and run the heartbeat on them. This turned out to be a more difficult task than originally anticipated, but by the end of the day, NGIT had delivered two new scripts to accomplish this. We had a couple more questions about when to make the physical cable connections and where in the process to run the new scripts. The NCF took our questions and got the answers the next morning while we were asleep here in Anchorage. The site could not perform the software installation until Wednesday for operational reasons anyway, so no real time was lost due to the time needed to get the px3 and 4 scripts ready. NGIT did a terrific job in supporting this change despite little notice (since last Friday when the decision was made).

Day 3

We swapped the px3 and px4 cables starting at 830AM when they let us have the system. Then started Section E in the mod note at 925AM. We got to the Update_NAS script with little incident when we got an error when the script tried and failed to reboot the NAS at 10:17AM. We called the NCF and NGIT determined a CPU had failed in the NAS and we needed a new motherboard. This stopped us dead so we returned the system to the forecasters and arranged for the backup to occur Thursday. NGIT got us the part by the evening and requested we wait until the morning to have them walk us through installing it. The site got the tracking number and verified it got on the plane and then insisted the part be delivered that evening as promised. They have a history of not getting parts delivered when promised, so the extra attention was needed to actually get the part up here in time.

Day 4

We installed the new part in the NAS and after a couple of tries, it was seated correctly and booted. We continued by rerunning the Update_NAS script at 823AM.

The Backup_Awips script in stgep F.4 failed when swapping the PX. NGIT had to change the script and do the swap manually because they couldn't get the px to swap. The rest of the script ran successfully. NGIT had to manually move the px3 and px4 data to the NAS. The entire data move took 3 ½ hours.

The Activate_NAS script (step F.5) took 45 minutes and failed to mount a lot of things. This was because local crons kept running. We are adding a step to instruct the sites to stop all local processes before starting this script. NGIT fixed the errors.

The next hurdle was to run the changes MDL specified to run the px3 and px4 from the NAS. We had many permission errors. Eventually, MDL made the changes and NGIT fixed the permission problems. The two new scripts NGIT provided ran without incident and took only 2 minutes each to run. AWIPS was back in business at 404PM. We finished up the mod note, without error, ran the px and dx failover tests and both ran perfectly. I ran the workstation performance tests and the site started using the system. A couple of local directories didn't get moved as noted in the errors and questions below.

Shipping:
The rack was shipped air freight to AFC. It arrived packed in a wood crate fastened with long drywall screws and 2 straps. The FMK boxes arrived in a single big box with it. The truck driver had nothing to move it off the truck and only delivered it to the site. The NWS staff have a forklift in their facilities building and used it to move the rack out

of the truck. The crate was too big to fit through the door to the "WFO so they moved it into the facilities building to get it out of the weather. They uncrated it (suggest a power screwdriver as the screws are in deep). The rack was on its side on a pallet wrapped in plastic and Styrofoam to protect it. They rolled it to the WFO building door, took 3 men to lift it upright, remove the pallet, then wheeled it into the building on the rack's wheels and into place. This process took about 2 hours to accomplish. The OCONUS sites should be warned about the delivery of this system so they can be prepared for the work.

Mod Note Changes:

In general, many of the notes are below the step where they apply. People are missing them so it would be better to place them before the step to which they apply.

A.2 Add: "Relabel the high speed switches by placing the HSW 1 and HSW 2 labels on the plate cover for port 25."

A.6 Change "If not, proceed to Step 6" to "…Step 7"

A.8 In note, add to the first sentence: over the next 154 to 20 minutes"

A.8.b Insert at beginning: "After the NCF completes the CPSBN failover, proceed."

A.8.h Change "sub-step d" to "sub-step e"

A.19 note: Add to the beginning: Call the NCF to have them monitor the next step."

A.22 Change "Connect the NAS end of the LSW…" to Connect the LSW end of the LSW…"

A.20 Add the reference "(Table 2)"

A.20 note: Move to step 17 at the beginning of the cable connection steps. Add in bold type: Connect all cables according to the tables. If there are conflicts, call the NCF to resolve them. M&C refers to the M&C 1. At collocated sites, with more than 7 workstations, a second M&C was installed with the new XTs.

B.2 note: Move to before step 4

B.4 Add to end: Wait until the NCF verifies the PX is fully up before proceeding, then notify the forecasters they can resume using the IFPS.

B.29 note: Move to step 28.

C.5.i At end of step, add: "Wait for the login cursor to appear."

C.10 Add to second sentence line: If the M&C console fails to enter the correct mode, call the NCF for help in setting it correctly.

D.2 Add: If the password prompt doesn't appear correctly as shown, call the NCF to get the M&C console into the proper state.

D.7.b) Delete "and press Enter"

D.11 Make into two steps as this is confusing "Press the Break key on the console."

"Connect the LSW2-xxx …"

D.12 Change to "Repeat steps 2 through 11 for LSW2

D.13 Add: Call the NCF to coordinate the following steps."

D.14 Add the command "Xyplex> Set priv system" to before the Xyplex>>
… command.

D.15 Add to end of step: "and reinsert the card."

E.2 After tail –f … command: "Verify "ds1-<site>": Package start completed at <date/time>" appears. Add command:
Cmviewcl   (Verify packages are up and running correctly
before proceeding.)

Add explanation to "exit" command: "(Returns to PX2)

F.5 Add in bold to emphasize: "Stop all local processes before continuing."

Questions and suggestions.

A.3 The ESA suggested it would be safer to ship the rack with the power strips switched off to prevent the possibility of a power surge occurring when the strips are plugged into the electrical outlets. Then the mod note should instruct to switch them on.

After the installation was completed:

At end, the directory /data/fxa/gempak is missing from ds1, missing from px1: /px1data/gempak but exits on px1: /px2data/gempak. This is a local application data directory, but should everything under data/fxa have been moved to the NAS? And what happened to the directory that had been on ds1 and px1:/px1data? The site easily fixed it, so nothing more need be done to this site.

On the workstations, /awips/fxa/ldad/data was linked to /dsdata/LDAD/data which is no longer functional. The site linked it to data/fxa/LDAD/data.

The workstation performance rating test showed the following:

On lx8, Z-pro, running 2 GFE sessions, east and west domain:
Before DX, WPR= 133 seconds, Avg. CPU use = 12.0%, WPR Avg Memory Use = 86.1%
After DX, WPR= 41 seconds, Avg. CPU use = 17.1%, WPR Avg Memory Use = 51.2%
On lx2, M-pro, running only the autotest scripts and nothing else:
Before DX, WPR= 53 seconds, Avg. CPU use = 29.7%, WPR Avg Memory Use = 31.3%
After DX, WPR= 52 seconds, Avg. CPU use = 33.2%, WPR Avg Memory Use = 58.0%

Many thanks to the site staff who worked so hard to get this installation done in winter with weather and to the NGIT staff who worked equally hard and for late hours to get us through this and even get the unique px3 and 4 into the new system. The numbers above show how worthwhile this change is and it will get better as we start to use the DXs with the upcoming software loads.

Just one more note on bringing AFC back to full operations Thursdaynight. Around 7 pm the lead forecaster, Victor Proton, called me athome to inform me the AVNfps and TextWS program were not receiving newdata. He had opened a trouble ticket with NCF. I asked Victor to callNCF again and have them contact Will at NCF or Doug Rankin (sp?). A fewminutes later Victor called me again with information from NCF. NCFsaid we were missing a "cluster" file that sounded to me like part ofthe removed cluster management software. I had Victor call NCF againand remind them we were now on the heartbeat system and again encouragethem to contact Doug. I asked Victor if he thought he needed to go backinto partial service backup. He said he could handle the 06Z tafpackage, but he would let his relief forecaster decide if he wantedJuneau and Fairbanks to take back the tafs if the problem was not fixed.I called the office around 5 am Friday morning and was informed dataflow into AVNfps and the TextWS had been restored and AFC was in fullnormal operations, including the AAWU.

DX Install – HFO 11/15/04 to 11/17/04

WFO HFO completed the DX/NAS installation at about 4PM. There were several hours of fixing links for local applications and servers. The site had the largest data base (24.2 gb) to move to the NAS of any site so far and they cleaned up the old stuff before. The restoration of service was rocky with some slowness and it took a long time to restore the queued data. The radar data did not come in and we opened a trouble ticket with the NCF (TT#194442). The NCF fixed it in fairly short order but it required all the workstations to reboot before the radar data populated the green times.

The hardware took 1 ½ days to complete. The software installation took 7 ½ hours until the system came back up. Most things were restored in another 4 hours. This site has many unique needs and systems to address them.

Issues:

1. The PX failovers seem to be adversely affected by the DX/NAS installation. Out of the 4 OAT sites and NMTR (5 systems so far), all have had numerous failures of the cluster manager swapping the PXs. While this is not a huge sample, it is disturbingly consistent. The NCF says that the cluster manager fails sometimes but not as consistently or frequently as has occurred during each of these DX/NAS/Serial MUX installations. Therefore a conclusion of the OAT is that something in this installation is affecting the cluster manager.

Since this installation removes the cluster manager from the system and replaces it with the heartbeat which appears to be much more stable, we do not recommend an effort to repair the cluster manager problem. However, since the PX swaps are very unreliable, the mod note should accommodate the expected failure of the swaps. We recommend the Backup_AWIPS.sh script be fixed to skip the px swap step and just check for the px#apps to be on px2. Then we add the step in the mod note to manually swap the px1apps to px2 and verify all the apps are running correctly before starting the Activate_NAS script. We cannot have Doug Rankin repairing the script for most of these installations and he has had to do this for each of them so far.

2. We need to have the sites diligently kill all processes and crons on all the servers, including any local non-awips servers, and unmount any local non-awips servers, have the NCF get out except as root before running the Activate_NAS script. We did this at HFO and only a couple of things we missed caused a failure of mounts in the script. This was the cleanest run of the Activate_NAS script yet so it seems to be important to shut everything down. HFO did not seem to need to reboot any workstations after the activation but the radar data did not come in. After the NCF fixed the strange problem in item 5 below, rebooting was required to get the radar data into the workstations.

3. We recommend all future sites make the patch to the DX/SW pocket hub if the new gig PX pocket hubs are not available at the time of their installation. The data copy ran about 15% faster at HFO than at AFC with the patch. Making the patch should speed up the install some and reduce the down time. NGIT will send the OAT and test system sites new gig pocket hubs for the PXs to retrofit them since the gig switches were supposed be part of the new architecture. NGIT will also send amended instructions for the mod note.

4. HFO and a few other sites have solid sides on their AS1 and CP racks. The VIR Switch Panel 2 (SwPnl2) is located in the CP rack with the AS1 rack in between it and the PX rack, thus preventing connecting the new serial MUX fan out cables to the cards installed into the PXs. NGIT told us to skip installing the fan out cables at HFO and said in the OB5 installation, they would be attached to the VIR Switch Panel 3 (SwPnl3) located in the AS1 rack. This would make HFO and the other sites in this situation configured non-standard again. There are open ports in SwPnl2. I recommend we wait until the decommissioning of the AS1 rack when it will be removed and the DX rack moved into it's place. At that time, the side panel will be accessible and can be removed. The fan out cable could then be connected as specified in the mod note and these sites will be standard with the rest of the NWS. The SwPnl3 is not used at this site but the ports needed for the fan out cables are completely filled. The SwPnl3 could be removed with no operational impact on this site.

5. The NAS directories /data/logs, /omni_shared, and /opt/gcc are at 100% following the installation. Each of them showed 1536000. The ESA deleted 3 days of logs and they dropped to 82%. These sizes are incorrect. The RadarServer log is huge and filled with and error PROBLEM Radar UUUUUUUUUUUUUUUUUU is currently not

being used by this site (portInfo.txt). Disregarding connection to UUUUUUUUUUUUUUUU. No radar data was being stored either. We opened a trouble ticket with the NCF (#194442). There are a number of apparent configuration errors:Config.C PROBLEM: Name NumMajorProds defined more than once in config file.
Config.C PROBLEM: Name index defined more than once in config file.
Config.C PROBLEM: Name prodTypeNames defined more than once in config
file.
Config.C PROBLEM: Name cwaIds defined more than once in config file.
Config.C EVENT: Name warngen.NumMajorProds existed, has been replaced
by new value.

Config.C EVENT: Name warngen.DefaultProduct.index existed, has been
replaced by new value.
Config.C EVENT: Name warngen.prodTypeNames existed, has been replaced
by new value.
Config.C EVENT: Name warngen.cwaIds existed, has been replaced by new
value.
The NCF cleared the /data/fxa/workfiles/wfoApi.StateInfo file was zero. The NCF deleted it and that restarted it and cleared the error. Then she bounced the radar server and the radar storage and it started plowing thorugh the backlogged data.

6. avnfps has links to /px1data/avnfps/... All these have to be deleted and linked to /awips/adapt/avnfps/... It still won't start after and the older version has an expired password so the site must wait until tomorrow for the program author to help.

So far, the heartbeat swapping has performed great at every site.

The mod note is in much better shape and we have learned more how this system will go into the WFOs. We expect to clean up the mod note, make some decisions on how to make it run a little smoother and clean up afterwards over the next week. I think the remaining sites will be able to start installing their system starting the week following Thanksgiving. Frank Lucadamo will be sending an email with instructions on how to sign up for the installations on the AWIPS calendar. Because of the large amount of work required of the NCF in addition to the site work, we need to control how many sites perform the installation at once.

Sites should plan on the hardware taking 1 1/2 days and schedule their service backup for the software installation accordingly. The hardware can go in and sit until the site and their backup are ready. Unfortunately, the hardware installation also impacts the forecasters but with coordination, it can be done while they continue operations.

I don't think there is any way to do this job without saying it is long, hard, and tedious. There is risk to getting operations fully back up and running after the activiation so sites should be prepared to do some health checks on their system and manually mount any non-awips servers and workstations. Some applications might also need links fixed. NGIT provided some guidance on what needs to be changed for these systems and programs that we will be passing along.

Thanks to AFC's severe problems with IFPS starting a day after they finished their installation, we discovered a missing hardware piece in the new AWIPS architecture - the PXs were supposed to be upgraded to gigbit pocket hubs. The OAT sites will be retrofitted with these. AFC also had some mysterious bad links show up a day after the installation that destroyed ifps operation. They are fixed now and we are investigating how those links happened. Thanks to the tiger team and a lot of hard work and teamwork, the problems were finally found and fixed this morning just in time to allow us to finish HFO's installation without undue risk.

We expect a typical WFO will take about 4-5 hours to complete the software installation with any local fixes taking however long they take. HFO and AFC took a long time because they are the largest WFO sites with the most data to move.

There are a few more mod note changes to come that I'll pass along a little later and some of them need consultation with WSH and NGIT - 14 1/2 hours is long enough for one day.

DX/NAS Installation Status - PTR 1/11-13/05

Tuesday, 1/11/04
We completed day one of the DX installation at PTR today in record time. We completed all the steps up to the point where we have to take the system down (Section E of the mod note) by 3:20pm local time. We waited for 1 1/2 hours in the morning to ensure the path cost didn't lock up and knock the servers down as has happened at 5 other sites until the forecasters had completed their main tasks. We followed Karl Baetke's (NCF) new procedure where we disconnect all the servers from the highspeed switch, make our changes, then reconnect them. It worked perfectly.

We have a few minor clarifications in the mod note and we need a few labels that were missing in the kit, but it went very smoothly. In all, the installation took only about 5 1/2 hours with the cable run that was done yesterday adding another hour.

This RFC does run IFPS/GFE but they do not have it running on the PXs. It is on its own server and they run the program on that server alone. Not having to wait at every point where we touch the PX until forecasters are at a stopping point with IFPS/GFE greatly sped up the hardware installation.

The PX failovers worked correctly except for the last one which required the NCF to reboot PX1. In addition, they often have the /awips/hydro mounted to both PX1 and PX2 which doesn't help things here and that occurred again when we restored the PXs to normal function. Maybe when we get rid of the cluster administrator and go to heartbeat that will resolve itself.

We will do the software installation tomorrow. They plan to be completed with the forecasting job by 8:30 or 9 am and give us the system then. Because of the amount of data here, we expect it will take quite awhile to complete the software portion.

Wednesday, 1/12/04
The forecasters finished their morning tasks before 9am and gave us the system. We began the software installation (Mode Note Section E) at 8:53AM and proceeded to Section F without any problems. The initial two runs of the Update_hostfile.sh script failed when it encountered an LX9 and then XT7 ssh failure. The LX9 was leftover from a former name of one of the non-awips workstations. They hade been renamed to na#, but one file still had the old name, LX9. Deleting that fixed it. XT7 did not have the ssh running on it for unknown reasons. We started that, the script completed successfully.

The Backup_AWIPS.sh script was started at 10:09, began the data copying at about 10:30 and finished at 4:35PM - about 5 ½ hours. Almost 53 gigabytes of data were moved to the NAS.

It took about 45 minutes to shut down all the processes and crons running in the system before we ran the Activate_NAS.sh script. The first try to run the script resulted in a failure to unmount /awips/hydroapps so we killed the script to find the link and kill it. Second try found a px2/home ncfuser in the system and we killed the script. The NCF got off and we killed some additional ncfuser links. Third try got through the unmounts without an error but got an error when it tried to disable px2apps, saying /awips/hydro failed to unmount. We killed the script again to find that link. Clustat said both px1apps and px2apps were disabled and we could find no user process using /awips/hydro but it failed a manual unmount command. Mark finally stopped the nfs, unmounted /awips/hydro, then restarted nfs. The fourth attempt finally worked and script completed. It seems worthwhile to use the script to find any hidden unmount problems and fix them before allowing it to complete. It took 41 minutes to complete once we fixed the problems. There were a few error messages that occurred in the script.

/data/fxa/ispan/hydro_adbs_pro didn't mount on any of the servers but it is mounted to the ax. We think that this is the way it is supposed to run (an archive function).
    Mounting NAS mount points on lx1-ptr...
    mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
    Updating /etc/fstab on lx2-ptr...
    Mounting NAS mount points on lx2-ptr...

mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx3-ptr...
Mounting NAS mount points on lx3-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx4-ptr...
Mounting NAS mount points on lx4-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx5-ptr...
Mounting NAS mount points on lx5-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx6-ptr...
Mounting NAS mount points on lx6-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx7-ptr...
Mounting NAS mount points on lx7-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist
Updating /etc/fstab on lx8-ptr...
Mounting NAS mount points on lx8-ptr...
mount: mount point /data/fxa/ispan/hydro_adbs_pro does not exist

Updating /etc/fstab on ax...
Mounting NAS mount points on ax...
mount: nas1:/vol/awips_hydroapps/lx/public failed, reason given by
server: Permission denied

Running /awips/ops/bin/hb_config_crontabs RP - Thu Jan 13 01:23:47 GMT 2005
ERROR: /awips/ops/data/mc/hb_cron_template-rp NOT FOUND!
Occurred when doing the rp1 and rp2 servers.

After the installation, none of the workstations would accept a login. This was due to a missing link. The state of the link prior to the DX install:

/awips/hydroapps/lx --> /awips/hydro

After the DX install, the link still existed as above but /awips/hydro was no longer a valid path on the NAS1 device. Mark changed the link above to look like:

/awips/hydroapps/lx --> /awips/px_hydro

Once this was done, we were able to login, and run with the Linux executables we had been using previous to the DX install. This needs to be noted in the mod note for RFCs or fixed in the script since as it stands, the installation renders the system unusable. Apparently, the physical name was changed from awips/hydro to px_hydro.

The scripts did not find the GIS server which is an old HP workstation (WS5) and make the appropriate mounts and links. This is still an AWIPS baseline system and should be included in the scripts for the RFC site type. Mark manually made the changes followigtn attachment B in the mod note.

The /awips/adapt and /data/adapt directories were not mounted. The RFCs don't use these directories so it might be correct, but that should be noted in the mod note.

We were finally finished with the critical clean up changes at 8PM.

Issues found Thursday after the installation, 1/13/05:

•   PTR did not get the documentation for the NAS. Apparently, some sites got about 3 feet of documentation.

• The awips/hydroapps/ispan data on the ds were not getting into the directory. The RFC moves SBN data to these directories for their processing needs and use the acqpatterns file. The acqpattern files were all moved to the px1in the DX/NAS installation, so the sites must adjust the acqpattern files on the px1 to ensure their data are going to the right directory on the NAS. This needs to be explained in the mod note.

• HADS data were going via ftp to the ds1. OH needs to decide where to put the data on the new systems (perhaps the REP?).

• A cooperator site did not get their RFC forcasts via an ftp link.

• D2D won't start on any of the XTs but we think they weren't set up to do so after the OB4 installation Mark set up the configuration file and they work fine and with a snappy response.

• The crontabs weren't working on the REP. We found the original file with the local crontabs and Mark followed the new crontab document to restore them to function under the new heartbeat setup.

These were fixed as they were found.

All in all, the installation went fairly smoothly but there is a critical need for better information on how the new system is structured and what the exact changes that were made are. RFCs in particular need to know exactly where things are so they can fix their many data sources and feeds.

It might be a good idea to use the installation scripts to clean up the system as they do a terrific job of identifying stale mounts and some things that shouldn't be laying around that no one knows are there. Maybe we should have the scripts stop and the site restart after they have cleaned up the old stuff as we did here.

The RFC reported some model runs ran noticeably faster. So fast that they couldn't see the intermediate stepping that they usually can.

Workstation Performance Report:

I ran the WPR test on two workstations, and older Mpro and newer Zpro.

```
LX2-ptr (Mpro)       Pre-DX        Post-DX
WPR:                      93 secs.          63              32% improvement
Avg. CPU Use:     31.9%           28.1%
Avg. Memory Use:   90.4%            40.6%


LX4-ptr (Zpro)       Pre-DX        Post-DX
WPR:                      174secs.          44               75% improvement
Avg. CPU Use:     13.0%           20.7%
Avg. Memory Use:   92.9%            65.1%


LX5-ptr (Zpro)       Pre-DX
WPR:                      96 secs.                           54% improvement
Avg. CPU Use:     12.5%
Avg. Memory Use:   51.7%
```

I tried running the WPR on an XT for fun but the autotest_002 script crashed d2d twice so I gave up. I guess the XTs can do d2d but only d2d-light.

LX4 started acting very badly in the middle of the test before the DX installation. It took a very long time for d2d to start. Mark had done a WPR earlier on LX5 that might more representative of their normal functioning.

Actions:

1.   Attach the cron document now slated for inclusion in the OB4.2 mod note in the DX/NAS mod note.

2.   NGIT review the above errors found in the activate script and explain what is ok and what isn't.

3.   NGIT address the link issue that rendered the workstations into a state where none could accept a login. (/awips/hydroapps/lx --> /awips/px_hydro)

4.   NGIT provide the missing labels for PTR and ensure all subsequent kits include the labels. (HUB1-PTR, HUB2-PTR, HS1, HS2, and the new label for LA1AW122 from M&C2 to PSW Port 16)

5.   Explain in the mod note the change to /awips/fxa/data/acq_patterns.txt file. It has moved to px1.

6.   HADS data were going via ftp to the ds1. OH needs to decide where to put the data on the new systems (perhaps the REP?).

7.   NGIT address the DX/NAS documentation for the system pieces. Apparently some sites got the documentation and some didn't. PTR wants the documentation.

DX Installation - AWC WNAW System - 1/25-26/05

Status:
The last OAT site completed their DX/NAS installation January 26. The hardware installation went very well with the exception of a non-DX related problem with a PowerVault disk error. The PX2 power cord was not fully seated in the receptacle and was accidently brushed. This caused the PX2 to power cycle a few times until the loose cord was discovered. Afterwards, the PX's alternately sounded the audible alarm and two PV disks showed amber lights. An hour and a half of diagnosis with the NCF and attempts to resolve the problem finally got the disks to show green and we proceeded. Later the 3 disk showed amber and the NCF diagnosed a failed disk.

The site's serial mux cards and fan cables were shipped separately in October and were sent to WFO Pleasant Hill, MO (EAX) without any indication they were meant for the AWC. EAX returned them to NGIT since they had double the correct number for their site. This was discovered recently and NGIT Fed Ex'd the parts to the site Monday and they arrived just in time for the installation. Apparently, packages are frequently shipped to EAX instead of the AWC and Training Center. When the site is clearly addressed, EAX ships them to this facility, but when not, they don't know where they are supposed to go.   The installation took 7 hours and 40 minutes with the delay for the PV disk problem. In all, including routing the cables, the actual hardware installation only took 6 hours.

The software installation was performed Wednesday, January 26. It took 8 ½ hours to complete. The major snag occured during the backup script when it encountered multiple errors resulting from a huge number of nested subdirectories (/Grid/FSL/netCDF/sfcndf/MAPS_PARMS/fslparms//fslparms/fslparms/fslparms... ad infinitum seemingly). It is unknown how this occurred but no link could be found and the script looks for recursive links. We believe the directories were real and contained the same data over and over again. The NCF wanted to recopy the /data/fxa directory because they couldn't tell whether this error resulted in a serious problem. This added about 2 ½ hours to the installation. When the error was corrected and the directory recopied, only a little under 10GB were moved to the nas into /data/fxa compared to 19GB for the first run. The NCF checked and couldn't find anything wrong so we conclude there were some 9 GB of trash in those recursive directories. The site moved about 18.25GB of legitimate data to the NAS.

We cleaned up the processes before running the activate script and found a couple of stray processes still running on the first start of the activate script. We killed the script, killed those processes and had to reboot the LX to get it to unmount, then restarted it. It ran successfully on the second try. NCEPs run processes to handle much of their product handling on an LX (called LDM and PDS) instead of LDAD since they do not have LDAD systems connected. The lack of the LDAD reportedly causes problems with most installations but while the error showed up, the scripts for this installation ran fine.

The cleanup here required only the configuration of one non-awips workstation and the changing of directories in the

LDM and PDS scripts to point to the NAS directories. A reference to /dsdata/ could not be found and caused the scripts to fail pushing the products. We put in a symbolic link from /dsdata/ to /data/fxa and the scripts correctly pushed the products as they were supposed to. They will investigate further to find out what the best way is to handle this particular function.

The Workstation Performance Rating was greatly improved:

Prior to the DX, running only the autotests:

WPR: 131 seconds
Avg CPU Use: 15.8%
Avg Memory Use: 90.4%

After the DX, running only the autotests:

WPR: 39 seconds
Avg CPU Use: 19.2%
Avg Memory Use: 55.1%

After the mod note is updated, this completes the OAT testing for the DX/NAS. I will write a report and send it out as soon as I am able to compile it. The mod note changes were sent under a separate email.

This has been a long and difficult installation but all the sites agree once it is in and any issues are resolved, it was well worth it. The performance is significantly enhanced, both as measured by the WPRs and the anecdotal comments from the forecasters at the test sites. Thanks to all who helped make this happen. And thanks to Kolly Mars who performed the installation and Larry Hinson at AWC. The site was terrific to work with.

Attachment D: Acronyms

OAT	Operational Acceptance Test
AWIPS	Advanced Weather Interactive Processing System
DX/NAS	Linux Data Server Replacements
NAS	Network Attached Storage
EHU	Southern Region
WFO	Weather Forecast Offices
BIS	WFO Bismarck, ND
EAX	WFO Pleasant Hill, MO
LWX	WFO Sterling, VA
BTV	WFO Burlington, VT
MAF	WFO Midland/Odessa, TX
JAN	WFO Jackson, MS
SLC	WFO Salt Lake City
HFO	WFO Honolulu, HI
AFC	WFO Anchorage, AK
RFC	River Forecast Center
PTR	NorthWest RFC
NCEP	National Center for Environmental Prediction
AWC	Aviation Weather Center
DS	Data Server
AS	Application Server
HADS	Hydrometeorological Automated Data System
GIS	Geographic Information System
IFPS	Interactive Forecast Preparation System
REP	River Ensemble Processor